

LYSURUS CRUCIATUS (LEPR. & MONT.) LLOYD IN ILLINOIS

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SUMMARY

The first collection of Lysurus cruciatus (Lepr. & Mont.) Lloyd in Illinois is reported.

Following the new concept of the species a taxonomical distinction between L. cruciatus and Lysurus gardneri Berkeley is established. This distinction is based in the position of the glebiferous region.

Anthurus borealis Burt is considered a synonym of L. cruciatus.

During October 1981 several fruit bodies of Lysurus cruciatus (Lepr. & Mont.) Lloyd were found in the yard of Mrs. Gries in Morton Grove, Illinois. The fungi were found on a lawn under a bird feeder. There were several completely developed fruit bodies and many still undeveloped (eggs) under the surface covered by the mycelium. This mycelium was producing fruit bodies from the last part of the summer and continued through all of November. The specimens collected were deposited in the Herbarium of the Field Museum of Natural History in Chicago.

This is the first record of this species in Illinois.

Lysurus cruciatus (Lepr. & Mont.) Lloyd had been considered by all the modern authors as the same as Lysurus gardneri Berkeley but according to Dring's (1980) work on the family Clathraceae it is obvious that they are two different species.

L. gardneri originally from Sri Lanka, Peradenilla, has a mostly southern hemisphere distribution. - Asia: Sri Lanka, India, Indonesia. Africa: Zaire and South Africa.

L. cruciatus originally from French Guiana, has a universal distribution. - South America: French Guiana, Brazil. North America: New York, New Jersey, Pennsylvania, Massachussetts, Ohio, Indiana, Michigan, Wisconsin (?), Iowa, Missouri (probably never cited), South Carolina, North Carolina, Florida, California, Canada and now Illinois. Europe: England, Germany, Netherlands, Portugal and Sweden. Western Asia: Israel. Africa: South Africa. Australia: Queensland.

In North America this species is very abundant in the east and is occasionally found in the Middle West, where it is more frequently collected in Ohio Sustine (1906) (1911), Beardslee (1901) (1912), Lloyd (1912), Michigan Rea (1955) and Indiana Bechtel (1935) but never until now collected in Illinois. Lloyd (1904) (1905) gave a list of stations for Anthurus borealis. Burk (1980) gives all the references for the collections of all the species of the family Clathraceae in the United States.

Lysurus cruciatus had been identified in America as Anthurus and with many specific names by several authors at different times.

Lysurus cruciatus was collected first in 1845 by Leprieur and Montagne. Later Fischer (1900) transferred it to Anthurus; Lloyd (1909) mentions this species several times under different names and called it Lysurus, using the correct name L. cruciatus for the first time. Burt (1894) made a very complete anatomical study of this species, calling it Anthurus borealis and under this name it has been known by many American authors but in the meantime several authors had described the same fungus under several specific names in Lysurus, Anthurus and Aserophallus (see list of synonyms, below). Several authors confused it with L. gardneri. Petch (1920) studying fresh material of L. gardneri from Ceylon and L. australiensis Cooke & Massee (L. cruciatus) from Australia established the difference between these two species based on the position and the structure of the glebiferous region, establishing a new genus, Pharus for L. gardneri. This

name was already in use in the Gramineae and was changed by Petch (1926) to Mycopharus, this name today is a synonym of L. gardneri. The main difference between L. gardneri and L. cruciatus is indeed the position of the glebiferous region on the columns or arms. In L. gardneri the gleba occupies the upper portion of the arms, leaving a sterile underpart; in L. cruciatus the glebiferous region covers entirely the length of the arms. Other important differences are that in L. gardneri the fertile glebiferous region is strongly villose and lamellate and the arms at the glebiferous portion are composed by a single thick-walled tube. In L. cruciatus there is no villosity nor are there lamellae and the arms are composed of (1)-3-5 regularly arranged tubes.

Dring (1980) thinks that the presence of sterile bases in the arms in L. gardneri is reminiscent of this character in Colus but the position of the gleba on the sides of the arms and the villose glebifer distinguishes it from Colus.

There is another species present in America, Lysurus mokusin Fries from Asia, which has been collected in California, Texas, Washington, D. C. and in Western Canada.

The receptacle of this species consists of a stipe with four to six buttresses (columns) running its whole length and continues upward with orange or red arms.

Lysurus periphragmoides (Klotzch) Dring had been collected in New York, Nebraska, Kansas, Maryland and Texas. Dring (1980) mentioned a collection in the Bahamas and another in the Dominican Republic.

The genus Anthurus Kalchbrenner & MacOwan in Kalchbrenner & Cooke, *Grevillea* 9: 2. 1880 has been reduced by modern authors to one species, A. archeri Berkeley. Cunningham (1942) admits also A. javanicus (Penz.) Cunningham; Zeller (1940) reduced Anthurus to synonym of Lysurus, founding his opinion in the facts that the type no longer exists and the original description of Anthurus could just as well be applied to Lysurus. Dring (1980) in his arrangement of the family, Clathraceae transferred all the species of Anthurus to Clathrus, Lysurus or Pseudocolus.

North American illustrations of this species are abundant under the names of Anthurus borealis or Lysurus gardneri.

Burt, Mem. Boston Soc. Nat. Hist. 3, Tab. 49, 50. 1894 as L. borealis.

Coker, Mycologia 37: 782. 1945 as L. pusillus.

Griffiths, Bull. Torrey Bot. Club 26: 628. 1899 as L. borealis.

Lloyd, Mycological Notes 30: 386. Fig. 219. 1908 as L. borealis; Mycological Notes 31: 407, Fig. 243. 1908 as L. gardneri; Synops. Known Phall. 1909. Fig. 38a as L. gardneri; Fig. 39 as L. australiensis, Fig. 40 and 41 as L. borealis, Fig. 42 as L. clarazianus, Fig. 44 as L. cruciatus, Fig. 45 as L. woodii, Fig. 510 as L. borealis.

Murrill, Mycologia 4 Tab. 68. Fig. 8. 1912 as L. borealis.

Rea, Papers Michigan Acad. Arts. Sci. 40: Fig. 1; Fig. 4-7. 1955 as L. borealis.

LYSURUS CRUCIATUS (Lepr. & Mont.) Lloyd

Synops. Known Phall. 40. 1909.

Aserophallus cruciatus Leprieur & Montagne, Ann. Sci. Nat. Bot. Ser. 3,4: 36. 1845.

Anthurus cruciatus (Lepr. & Mont.) Fischer, Schweiz. Ges. Nat. 36: 41. 1900.

Lysurus clarazianus Muller Art., Flora 56: 526. 1873.

Anthurus clarazianus (Mull. Art.,) Fischer, Denkschr. Schweiz. Ges. Nat. 36: 42. 1900.

Anthurus woodii MacOwan in Kalchbrenner, Phall. Nov. 23. 1880.

Lysurus woodii (MacOwan) Lloyd, Synops. Known Phall. 40. 1909.

Lysurus texensis Ellis ex Gerard, Bull. Torrey Bot. Club 7: 30. 1880. non nud.

Lysurus argentinus Spegazzini, An. Soc. Ci. Argent. 24: 68. 1887.

Mutinus sulcatus Cooke & Massee in Cooke, Grevillea 17: 69. 1889.

Lysurus sulcatus (Cooke & Massee) Cunningham, Proc. Linn. Soc. N.S.W. 56: 189. 1931.

Lysurus australiensis Cooke & Massee in Cooke, Grevillea 18: 6. 1889.

- Anthurus australiensis (Cooke & Masee) Fischer,
Denkschr. Schweiz. Ges. Nat. 33: 27. 1893.
Anthurus sanctae-catharinae Fischer in Saccardo,
Sylloge Fungorum 7: 23. 1888.
Aserophallus sanctae-catharinae (Fischer) O. Kuntze,
Rev. Gen. Pl. 2: 844. 1891.
Lysurus sanctae-catharinae (Fischer) P. Hennings,
Hedwigia 41 Beibl: 172. 1902.
Anthurus borealis Burt, Mem. Boston Soc. Nat. Hist.
3: 504. 1894.
Lysurus borealis (Burt) P. Hennings, Hedwigia 41
Beibl: 172. 1902.
Lysurus borealis var. klitzingii P. Hennings,
Hedwigia 41 Beibl. 173. 1902.
Lysurus borealis var. serotinus Peck, Bull. New
York State Museum 157: 49. 1912.
Lysurus tenuis Bailey, Queensland Agricultural
Journal 27: 306. 1911.
Lysurus pusillus Coker, Mycologia 37: 781. 1945.

Unexpanded fruit bodies (eggs) white, globose to obovoid, 3 to 6 cm diameter, with meridional grooves along the lines of insertion of the sutures, corresponding to the columns of the receptacle; peridium of three layers, the outer thin and furfuraceous, the middle one thick and gelatinous, the internal very thin and membranous, dehiscent. Development of the fruit-body multipileate.

Expanded plant 15 cm long; mature receptacle consisting of a stipe surmounted by several vertical columns or arms; stipe 10 cm long, 2 cm. diameter, white or pale cream below, white or pinkish above, obconical or fusiform, consisting of two or three layers of intercommunicating tubes, hollow; columns or arms four to seven, conical, with a very marked groove down the length of the abaxial surface, 4 cm. long, erect, narrowly lanceolate, transversally rugulose, palid orange, initially united at the tips, eventually free, tending to curve away from the axis of the receptacle composed of 3-5 regular arranged thickwalled tubes; the rugose glebiferous layer is continued from arm to arm around the sinus between arms; gleba brown, in the entire inner and lateral surface of the arms, leaving a free groove in the outer face, deliquescent slowly; odor slightly fetid; spores ellipsoid-cylindric 4-4.5 x 1.5-2 μ m., epispore smooth, hyaline.

TYPE: Leprieur. 1845. Herb. Montagne (P), Cayenne, French Guiana.

ILLINOIS: Gries, Ponce de Leon #1030, Morton Grove, November 20, 1981.

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LITERATURE CITED

- Bechtel, A. R. 1935. Rare Gasteromycetes in Indiana. Proc. Indiana Acad. Sci. 44: 79-80.
- Beardslee, H. C. 1901. Anthurus borealis in Northern Ohio. Annual Report Ohio State Acad. Sci. 9: 19.
- _____, 1912. An acre of Lysurus in Lloyd, Myc. Notes 38: 515-516.
- Burk, W. R. 1980. A Bibliography of North American Gasteromycetes: I Phallales. Bibliotheca Mycologica Band 73 Cramer, Vaduz.
- Burt, E. A. 1894. A North American Anthurus, its structure and development. Mem. Boston Soc. Nat. Hist. 3: 487-505.
- Cunningham, G. H. 1942. The Gasteromycetes of Australia and New Zealand. Dunedin, N.Z. Reprint 1949 Bibliotheca Mycologica, Band 67. Cramer, Vaduz.

- Dring, D. M. 1964. Towards an arrangement of Clathraceae. Kew Bull. 35(1): 76-79.
- Fischer, E. 1900. Denkschr. Schweiz. Ges. Nat. 36: 41.
- Lloyd, C. G. 1904. Anthurus borealis in England. Myc. Notes 17: 183-184 and 188.
- _____ 1905. Stations for Anthurus borealis. Myc. Notes 19: 219-220.
- _____ 1906. Concerning the Phalloids. Mycological Notes 24: 293-301.
- _____ 1907. Phalloids of Australasia. 24pp. Cincinnati.
- _____ 1908. Mycological Notes 31: 407. fig. 243.
- _____ 1909. Synopsis of the Known Phalloids, 96pp. Cincinnati.
- _____ 1912. The umbilical plates of Clathroid Phalloid. Myc. Notes. 38: 512-515.
- _____ 1912. Lysurus borealis at Cincinnati. Myc. Notes 38: 515.
- Petch, T. 1920. Further Notes on Colus gardneri (Berk) Fischer. Transactions of the British Myc. Soc. 6: 131.
- _____ 1926. Studies in Entomogenous Fungi (Note). Transactions of the British Myc. Soc. 10: 281.
- Rea, P.M. & Heidenhain, B. 1955. The Genus Lysurus. Pap. Michigan Acad. Sci. 40: 49-66.
- Sunshine, D. R. 1906. Notes on Anthurus borealis. Ohio Naturalist 6: 474.



Lysurus cruciatus (Lepr. & Mont.) Lloyd, Morton Grove, Illinois, Gries & PPL 1030. Nov. 20, 1981. Above: Spore 14,000 x SEM. Below, left: Specimen half natural size. Below, right: Basidium with some spores 2,000 x.